International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2025: 7.089

The Psychological Aspects of Consumption and Accessibility of Electric Vehicle Users in Kerala

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Abstract: ***The rapid transition from conventional fossil-fuel-powered vehicles to electric vehicles (EVs) represents not only a technological advancement but also a significant behavioural shift in consumer mobility. Although government policies, financial incentives, and technological innovations have accelerated EV adoption, consumers' psychological perceptions continue to influence purchase decisions, ownership experiences, and long-term acceptance. This study examines the psychological aspects of consumption and accessibility among electric vehicle users in Kerala, India. Specifically, it explores the influence of environmental attitudes, economic motivations, technology acceptance, ownership satisfaction, range anxiety, and charging accessibility on EV adoption. A descriptive cross-sectional research design was employed, and data were collected from 63 electric vehicle users through a structured online questionnaire. The responses were analysed using descriptive statistical techniques. The findings indicate that economic benefits are the primary driver of electric vehicle adoption, while environmental concern and technological interest also significantly influence ownership decisions. Although users reported high satisfaction and confidence in electric vehicles, concerns regarding charging accessibility and range anxiety continue to affect long-distance travel and broader adoption. Environmental concern (21.3%) and interest in innovative technology (14.8%) also influenced purchasing decisions. Most respondents reported high levels of driving confidence (77%), ownership satisfaction (77%), and willingness to recommend EVs to others (84.1%). However, approximately 42% of users continue to experience range anxiety, while nearly half of the respondents (46%) identified the expansion of charging infrastructure as the most important requirement for encouraging wider EV adoption. The findings support the Theory of Planned Behaviour, the Technology Acceptance Model, and the Diffusion of Innovation Theory by demonstrating that positive attitudes, perceived usefulness, environmental responsibility, and social influence encourage EV adoption. However, limitations in charging infrastructure and accessibility reduce consumers' perceived behavioural control and continue to create psychological uncertainty. The study concludes that Kerala possesses a strong psychological foundation for sustainable electric mobility. Nevertheless, further investment in charging infrastructure, service accessibility, consumer awareness, and supportive government policies is essential to sustain long-term adoption.***

Keywords: Electric vehicles, Consumer psychology, Technology Acceptance Model, Theory of Planned Behaviour, Environmental attitude, Range anxiety, Accessibility, Sustainable mobility, Kerala.

1. Introduction

The global transportation sector is experiencing a major transformation as countries increasingly shift from conventional fossil-fuel-powered vehicles to cleaner and more sustainable electric mobility solutions. Growing concerns regarding climate change, rising fuel prices, greenhouse gas emissions, and environmental sustainability have encouraged governments and automobile manufacturers worldwide to invest in electric mobility. Electric vehicles have emerged as an environmentally friendly alternative to conventional petrol and diesel vehicles because they produce lower emissions, reduce dependence on fossil fuels, and offer lower operating and maintenance costs (Alanazi, 2023).

In India, the transition towards electric mobility has gained considerable momentum through initiatives such as the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme and the recently introduced PM E-DRIVE programme. Similarly, the Government of Kerala has actively promoted electric mobility by introducing state-level EV policies, expanding charging infrastructure, and encouraging the adoption of sustainable transportation systems.

Despite these technological and policy developments, purchasing an electric vehicle is not purely an economic decision. Consumer behaviour is strongly influenced by psychological factors such as environmental concern, attitudes toward sustainability, perceived usefulness, confidence in technology, social influence, perceived risk, and accessibility to charging infrastructure. Previous studies have shown that positive consumer attitudes significantly influence EV purchase intentions, whereas concerns regarding battery performance, charging convenience, and maintenance facilities often discourage adoption (Khurana et al., 2020; Goel et al., 2021).

Kerala provides an ideal setting for studying these behavioural factors because of its relatively high literacy rate, growing environmental awareness, increasing EV adoption, and supportive government initiatives. However, differences in infrastructure availability across urban and rural areas continue to create practical and psychological barriers. Therefore, understanding the experiences of existing EV users is essential for identifying both the motivating factors and the challenges that influence sustainable mobility in Kerala.

2. Theoretical Framework and Literature Review

The present study is based on three widely accepted behavioural theories that explain consumer technology adoption: the Theory of Planned Behaviour (Ajzen, 1991), the Technology Acceptance Model (Davis, 1989), and the Diffusion of Innovation Theory (Arora et al., 2022).

According to the Theory of Planned Behaviour, an individual's behaviour is determined by attitudes, subjective norms, and perceived behavioural control. In the context of electric vehicles, consumers are more likely to adopt EVs

when they hold favourable attitudes towards environmental sustainability, receive encouragement from family and society, and believe that charging and maintaining the vehicle will be convenient. Deka et al. (2023) found that subjective norms and perceived behavioural control are among the strongest predictors of EV adoption in India.

The Technology Acceptance Model explains that consumers adopt new technologies when they perceive them to be useful and easy to use. Lower fuel costs, reduced maintenance expenses, quieter operation, and home charging convenience increase the perceived usefulness of electric vehicles. Hasan et al. (2024) reported that consumers who recognise both environmental benefits and economic value develop stronger positive attitudes towards EV adoption.

The Diffusion of Innovation Theory further explains how innovative technologies gradually spread through society. Arora et al. (2022) demonstrated that favourable consumer attitudes accelerate EV adoption, whereas concerns regarding charging infrastructure, technological uncertainty, and accessibility slow the diffusion process. Similarly, Goel et al. (2021) highlighted that inadequate charging infrastructure and range anxiety continue to remain major psychological barriers to widespread EV adoption in India.

Recent studies have also shown that environmental awareness, government incentives, technological confidence, and social influence positively affect consumer behaviour (Rafiq et al., 2023; Kumar et al., 2025). However, concerns regarding battery life, charging availability, servicing facilities, and long-distance travel continue to influence consumers' purchasing decisions (Krishnaswamy & Deilami, 2024; Yadav & Yadav, 2024).

2.1 Research Gap

Although numerous studies have investigated consumers' intentions to purchase electric vehicles, relatively limited research has focused on the actual experiences of existing EV users, particularly in Kerala. Most previous studies examine purchase intention before adoption rather than psychological adaptation after ownership. Existing users provide valuable insights into satisfaction, driving confidence, accessibility, charging behaviour, and range anxiety that cannot be fully understood through intention-based studies. Furthermore, limited empirical evidence is available regarding how psychological perceptions evolve after consumers begin using electric vehicles. Understanding these post-adoption experiences can assist policymakers, manufacturers, and infrastructure planners in designing strategies that support long-term EV acceptance. Therefore, this study seeks to bridge this research gap by examining the psychological aspects of consumption and accessibility among current electric vehicle users in Kerala.

3. Methodology

The present study employed a **quantitative, descriptive, cross-sectional research design** to examine the psychological aspects influencing the consumption and accessibility of electric vehicles among users in Kerala. A quantitative approach was considered appropriate because it enabled the systematic collection and analysis of data related to consumers' attitudes, motivations, perceptions, and ownership experiences.

Primary data were collected using a **structured questionnaire** developed through Google Forms. The questionnaire consisted of demographic questions along with items measuring purchase motivation, environmental concern, technology acceptance, driving confidence, ownership satisfaction, charging accessibility, range anxiety, awareness of government incentives, and future purchase intentions. The questionnaire was distributed through electric vehicle user groups, social media platforms, and personal networks across different districts of Kerala.

A convenience sampling technique was employed because electric vehicle users constitute a relatively specialised and geographically dispersed population, making probability sampling difficult within the study period. A total of **63 valid responses** were received and included in the final analysis. The collected data were organised and analysed using descriptive statistical techniques, including frequencies and percentages, to identify dominant behavioural trends and psychological patterns among EV users. The study primarily focused on understanding existing consumer experiences rather than establishing causal relationships.

4. Results

The analysis revealed several important insights into the psychological behaviour and experiences of electric vehicle users in Kerala. Economic savings emerged as the dominant motivation for purchasing electric vehicles, with nearly two-thirds of respondents identifying lower fuel costs as the primary reason for adoption. Nearly two-thirds of the respondents (63.9%) identified fuel-cost savings as their primary reason for purchasing an EV, while environmental concern (21.3%) and interest in innovative technology (14.8%) also influenced purchase decisions. These findings suggest that although financial benefits initially encourage adoption, environmental values continue to reinforce long-term ownership satisfaction.

The respondents reported **high levels of confidence and satisfaction** with their electric vehicles. Approximately 77% expressed confidence while driving their EVs and reported satisfaction with their overall ownership experience. Furthermore, a large majority believed that electric vehicles offered a smoother, quieter, and more enjoyable driving experience than conventional petrol or diesel vehicles. These findings indicate that positive ownership experiences strengthen consumers' confidence in electric mobility and increase the likelihood of recommending EVs to others.

Despite these positive experiences, certain psychological and infrastructural concerns remain. Nearly **42% of respondents reported experiencing range anxiety** at least occasionally, reflecting concerns about battery depletion during long-distance travel. Although many participants considered home charging convenient, almost half of the respondents (46%) identified the expansion of public charging infrastructure as the most important requirement for promoting wider EV adoption. These findings highlight that while consumers

have developed confidence in EV technology, accessibility to reliable charging facilities continues to influence their travel behaviour and perceived convenience.

Overall, the results demonstrate that electric vehicle users in Kerala possess favourable attitudes towards sustainable mobility, but improvements in infrastructure and service accessibility are essential for maintaining consumer confidence and encouraging broader adoption.

5. Discussion

The findings of the present study support existing theories and empirical research on electric vehicle adoption. Consistent with the **Theory of Planned Behaviour (Ajzen, 1991)**, favourable attitudes towards environmental sustainability, positive social influence, and confidence in using electric vehicles significantly contribute to adoption and continued usage. Respondents who perceived EVs as environmentally beneficial and economically advantageous demonstrated stronger satisfaction and a greater willingness to recommend electric vehicles to others.

The present findings further support the Technology Acceptance Model by demonstrating that consumers perceive electric vehicles as both useful and convenient for everyday transportation. Participants perceived electric vehicles as useful because of their lower running costs, reduced maintenance expenses, and improved driving comfort. The convenience of home charging and the positive driving experience further enhanced perceptions of ease of use, thereby increasing consumer acceptance. Similar observations have been reported by Hasan et al. (2024), who found that environmental concern combined with perceived economic value significantly strengthens positive attitudes towards EV adoption among Indian consumers.

However, the findings also indicate that technological acceptance alone is insufficient to eliminate psychological barriers. Although respondents expressed high levels of satisfaction with their vehicles, **range anxiety** remained a significant concern for many users. This finding is consistent with studies by Goel et al. (2021), Noel et al. (2019), and Krishnaswamy and Deilami (2024), which identified inadequate charging infrastructure as one of the strongest psychological barriers to electric mobility. The availability of charging stations not only determines practical accessibility but also influences consumers' confidence, perceived behavioural control, and willingness to undertake long-distance travel.

The findings further demonstrate that existing EV users place greater importance on expanding charging infrastructure than on additional purchase subsidies. This suggests that consumers increasingly trust the technology itself but require stronger infrastructural support to reduce uncertainty and improve overall convenience. Therefore, investments in reliable charging networks, servicing facilities, and consumer education may have a greater impact on future adoption than financial incentives alone.

6. Conclusion and Practical Implications

The present study demonstrates that electric vehicle users in Kerala have developed a strong psychological acceptance of sustainable mobility. Most respondents expressed positive attitudes towards electric vehicles, reporting high levels of satisfaction, driving confidence, and a willingness to continue using and recommending EVs. Financial savings, environmental responsibility, technological confidence, and a better driving experience emerged as the key factors influencing consumer acceptance. These findings are consistent with the **Theory of Planned Behaviour** (Ajzen, 1991), the **Technology Acceptance Model** (Davis, 1989), and recent studies by **Deka et al. (2023)**, **Hasan et al. (2024)**, and **Rafiq et al. (2023)**, which highlight the importance of positive attitudes, perceived usefulness, and social influence in encouraging EV adoption.

Despite these encouraging findings, the study also reveals that psychological readiness alone is not sufficient for widespread adoption. Persistent range anxiety, inadequate public charging infrastructure, and limited-service facilities continue to influence consumers' confidence, supporting the observations of **Goel et al. (2021)**, **Arora et al. (2022)**, **Krishnaswamy and Deilami (2024)**, and **Yadav and Yadav (2024)** that infrastructure remains a critical determinant of electric vehicle acceptance.

The findings suggest that policymakers, automobile manufacturers, and charging service providers should work collaboratively to expand reliable charging infrastructure, improve after-sales service, strengthen consumer awareness of government incentives, and provide transparent information about battery performance and maintenance. Such measures can reduce psychological barriers, enhance consumer confidence, and improve the overall ownership experience.

Overall, Kerala possesses favourable social, environmental, and psychological conditions for accelerating electric mobility. Continued investment in charging infrastructure, consumer education, after-sales support, and policy implementation will further strengthen public confidence and facilitate sustainable transport adoption across the state. By combining supportive government policies, technological innovation, accessible infrastructure, and consumer-centred awareness programmes, the state can significantly increase electric vehicle adoption while contributing to environmental sustainability, energy security, and long-term economic development.

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